

CLAIMS

What is claimed is:

1. A droplet discharging apparatus comprising:

means for discharging a discharge liquid in the form of droplets through an aperture by mechanically deforming a piezoelectric element by a normal drive signal, and

wherein the droplets are discharged from the aperture by a cooling drive signal, which is different from the normal drive signal.

2. The droplet discharging apparatus according to Claim 1, wherein the droplets are discharged for a plurality of times by the cooling drive signal so as to cool the discharge liquid to a specified temperature.

3. The droplet discharging apparatus according to Claim 1, wherein the cooling drive signal is set to a low frequency level that does not cause the piezoelectric element to heat the discharge liquid.

4. The droplet discharging apparatus according Claim 1, wherein the cooling drive signal has a waveform shape set so as to cause droplets of a maximum weight to be discharged.

5. The droplet discharging apparatus according to Claim 1, wherein if the temperature of the discharge liquid detected by a temperature detecting means exceeds a predetermined threshold temperature, then the droplets are discharged from the aperture by the cooling drive signal.

6. The droplet discharging apparatus according to Claim 1, wherein if the number of discharges within a predetermined time performed in response to the normal drive signal exceeds a predetermined threshold number of times, then the droplets are discharged from the aperture by the cooling drive signal.

7. The droplet discharging apparatus according to Claim 1, wherein cooling discharge by the cooling drive signal is carried out between normal discharges of droplets by the normal drive signal.

8. The droplet discharging apparatus according to Claim 1, wherein the discharge liquid is a printing ink.

9. The droplet discharging apparatus according to Claim 1, wherein the discharge liquid is an electrically conductive material for forming a wiring pattern.

10. The droplet discharging apparatus according to Claim 1, wherein the discharge liquid is a transparent resin for forming a microlens.

11. The droplet discharging apparatus according to Claim 1, wherein the discharge liquid is a resin for forming a color layer of a color filter.

12. The droplet discharging apparatus according to Claim 1, wherein the discharge liquid is an electro-optic material.

13. The droplet discharging apparatus according to Claim 12, wherein the electro-optic material is a fluorescent organic compound exhibiting electroluminescence.

14. A film manufacturing apparatus for forming a film of a discharge liquid by using the droplet discharging apparatus according to Claim 1.

15. Electronic equipment comprising a device manufacturing by using the film manufacturing apparatus according to Claim 14.

16. A droplet discharging method comprising:
discharging a discharge liquid in the form of droplets through an aperture by mechanically deforming a piezoelectric element, and
wherein the discharge liquid is cooled by cooling discharge, which is different from normal discharge.

17. The droplet discharging method according to Claim 16, wherein the cooling discharge is carried out for a plurality of times so as to cool the discharge liquid to a specified temperature.

18. The droplet discharging method according to Claim 16, wherein the cooling discharge is set to a low frequency level that does not cause the piezoelectric element to heat the discharge liquid.

19. The droplet discharging method according to Claim 16, wherein the cooling discharge causes droplets of a maximum weight to be discharged.

20. The droplet discharging method according to Claim 16, wherein if the temperature of the discharge liquid exceeds a predetermined threshold temperature, then cooling discharge is carried out.

21. The droplet discharging method according to Claim 16, wherein if the number of normal discharges within a predetermined time exceeds a predetermined threshold number of times, then the cooling discharge is carried out.

22. The droplet discharging method according to Claim 16, wherein cooling discharge is carried out during the normal discharge.

23. The droplet discharging method according to Claim 16, wherein the discharge liquid is a printing ink.

24. The droplet discharging method according to Claim 16, wherein the discharge liquid is an electrically conductive material for forming a wiring pattern.

25. The droplet discharging method according to Claim 16, wherein the discharge liquid is a transparent resin for forming a microlens.

26. The droplet discharging method according to Claim 16, wherein the discharge liquid is a resin for forming a color layer of a color filter.

27. The droplet discharging method according to Claim 16, wherein the discharge liquid is an electro-optic material.

28. The droplet discharging method according to Claim 27, wherein the electro-optic material is a fluorescent organic compound exhibiting electroluminescence.

29. A film manufacturing method for forming a film of a discharge liquid by using the droplet discharging method according to Claim 16.

30. A device manufacturing method for manufacturing devices by using the film manufacturing method according to Claim 29.